

**We claim:**

1. A process for the preparation of semi-conducting polymer film containing beta crystalline phase of polyvinylidene fluoride which comprises dissolving polyvinylidene fluoride in a solvent, dispersing conducting particles therein, casting the dispersed solution on a substrate, evaporating the solvent to obtain a film, drying the film, conditioning the film by holding the film between two metal plates, applying electric potential for a duration of 10 to 300 min, removing the film to give a polymer film containing high beta crystalline phase of polyvinylidene fluoride.
2. A process as claimed in claim 1 wherein the polyvinylidene fluoride used has ethylene content of less than 2 %.
3. A process as claimed in claim 1 wherein the solvent used for dissolving and casting films has amide substituted group and has dielectric constant between 20 to 45.
4. A process as claimed in claim 1 wherein the solvent used is dimethyl acetamide.
5. A process as claimed in claim 1 wherein the conducting particles are selected from the group consisting of particles of polyaniline powder, graphite powder and colloidal silver dispersion in amyl acetate.
6. A process as claimed in claim 1 wherein the conducting particles added to the solution have particle size in the range of 0.1 to 20 micrometers and concentration in the range of 2 to 30 %.
7. A process as claimed in claim 1 wherein the conducting particles used have conductivity in the range of  $10^{-3}$  to  $10^4$  S/cm.
8. A process as claimed in claim 1 wherein the film is cast in stainless steel dish at a temperature in the range of 45° to 90°C.
9. A process as claimed in claim 1 wherein the electric voltage used for treatment is in the range of 10 V to 100 V.
10. A process as claimed in claim 1 wherein the temperature used for conditioning is in the range of 40°C to 100°C.
11. A process as claimed in claim 1 wherein the temperature used for conditioning is 80°C.
12. A process as claimed in claim 1 wherein the film is cast by spin coating on a smooth substrate with metal electrodes deposited on both sides of the film to form a device directly containing the beta crystalline phase of polyvinylidene fluoride.
13. A process as claimed in claim 1 wherein the concentration of the conducting particles ranges from 3 % to 50% of the polymer.

14. A process as claimed in claim 13 wherein the concentration of the conducting particles is 20% by weight of the polymer.

15. A process as claimed in claim 1 wherein the time for application of electric voltage is in the range of 10 min to 300 min preferably 60 min.

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